

Amendments to the Specification

All references to the specification below are to U.S. Published Application No. 2004-0159803.

Please replace the paragraph [0066] with the following rewritten paragraph:

This invention utilizes nondestructive measurements of fluorescent signals produced as a result of exposure to ionizing radiation (X-rays, gamma rays, or beta particles). Unirradiated Al_2O_3 crystals contain high concentration of Type I color centers responsible for the blue absorption band at 435 nm and emission at 520 nm (presumably $\text{F}_2^{2+}(\text{2Mg})$ -centers) and low concentration of Type II color centers responsible for 335 and 620 nm absorption/excitation bands and 750 nm emission band (presumably $\text{F}_2^+(\text{2Mg})$ -centers). After exposure to ionizing radiation, the concentration of Type I color centers is reduced and the concentration of Type II color centers is increased. In one embodiment, the luminescent material of the present invention may have one or more color centers having absorption bands in the region of 335 ± 5 nm and 620 ± 10 nm, an emission in the region of 750 ± 5 nm and a 75 ± 10 ns fluorescence lifetime. In another embodiment of the present invention, the luminescent material of the present invention may be exposed to a light source having a wavelength in the range between 290 to 380 nm. In yet another embodiment of the present invention, the luminescent material of the present invention may be exposed to a light source having a wavelength in the range between 300 to 370 nm. In yet another embodiment, the luminescent material may be exposed to a light source having a wavelength in the range between 550 and 700 nm

Please replace the paragraph [0074] with the following rewritten paragraph:

The $\text{Al}_2\text{O}_3\text{:C,Mg}$ single crystals are characterized by several new OA bands with a blue absorption band responsible for the visible green coloration of the crystals. The new material has double oxygen vacancies in the form of F_2^{2+} centers, charge-compensated by the nearby Mg-impurity atoms. The aggregate defect composed of two oxygen vacancies and two Mg-impurity atoms with two localized electrons, is denoted here as $\text{F}_2^{2+}(\text{2Mg})$. It

is responsible for a blue absorption-excitation band at 435 nm, produces green fluorescence centered at 520 nm, and has a short fluorescent lifetime of 9 ± 3 ns. In one embodiment of the present invention, fluorescent light may be emitted from luminescent material at a wavelength in the range between 450 and 600 nm and centered at 520 ± 10 nm. In another embodiment of the present invention, the luminescent material may be exposed to a light source having a wavelength in the range between 370 to 490 nm. In yet another embodiment of the present invention, the luminescent material may have one or more color centers having an absorption in the region of 435 ± 5 nm, an emission in the region of 520 ± 5 nm and a 9 ± 3 ns fluorescence lifetime.